Committee on Resources,

Subcommittee on Fisheries Conservation, Wildlife & Oceans

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Witness Statement

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The Magnuson Act in its original and amended forms has been in effect for more than 25 years. Fisheries management under the Sustainable Fisheries Act must be undertaken using the best available scientific information. From the outset, it was recognized that knowledge of many fished stocks was incomplete. Basic knowledge of biology sometimes was lacking; understanding of population dynamics and estimates of abundance, mortality rates, and production potential often were completely lacking. In the 1970s there already was a sense that management dependent on defining a 'Maximum Sustainable Yield,' which assumes that the productivity of a fished stock is a function only of the stock's biomass, was insufficient. Nevertheless, this easily-calculated, objective criterion became the standard by which management measures were gauged. MSY still remains an important reference point in management of U.S. fish stocks in the Exclusive Economic Zone, although not usually the target that it once was. In the early days of the Magnuson Act, most members of Scientific and Statistical Committees that advised the Councils struggled to understand MYY and few on the Councils understood the concept. The SSCs and the Councils have grown in knowledge and sophistication about fisheries principles and concepts in the ensuing 20 years. We now understand the MSY concept, know that it is insufficient as a management standard and target reference point, but we also now recognize how complex fish population biology is, especially when effects of fishing are added to the mix of environmental variability that is common in marine ecosystems.

The science and technology associated with stock assessments certainly has advanced since implementation of the Magnuson Act and has continued to improve since reauthorization in 1996. The evolution of stock assessment modeling has been particularly significant. A recent National Academy of Science report (NAS, 1998) noted that assessment methods are relatively reliable and robust when the data on abundances are reliable. The caveat is important. The conclusion in the 1998 report was supported by a second NAS report (NAS, 2000a) on marine fisheries data collection that urged Congress, NMFS and the Regional Councils to standardize, upgrade and improve the methods to collect, manage and use data as an important step towards improving stock assessments and management based upon assessments. Stock assessments are far from perfect and are dogged by uncertainties that concern fishers and managers alike. The quality of assessment models, however, is not the major problem in reliably managing fish stocks under the SFA.

The fraction of overfished stocks in the U.S. fisheries is similar to that reported globally (25-30%). A smaller fraction of these stocks is near collapse and requires draconian measures to stabilize them and restore them. Restoration may take decades for some stocks, even under the best restoration scenarios. NOAA/NMFS reports in recent years have indicated an increase in the number of identified overfished stocks, but those increases are mostly a consequence of better stock assessments that have now categorized stocks that were previously uncategorized (the majority of stocks) as overfished. There has been no dramatic shift in numbers of overfished stocks since 1996. There is reason to believe that management can be

effective under the SFA and improve the status of many heavily exploited stocks.

Specific guidelines for rebuilding of overfished stocks were provided in the amended SFA. In the most recent years, Councils have tried to follow these guidelines, but in most cases stock rebuilding is still underway and success cannot be judged yet. I am cautiously optimistic that the new paradigms of fisheries management that became prevalent in the 1990s on a global scale will be beneficial to U.S. fisheries and will stabilize overfished stocks, successfully rebuilding many of them.

The new paradigms, which are recognized in the amended SFA hinge on the 'precautionary approach' to resource management that has been adopted as a standard globally (FAO 1995). Is this paradigm worth more than the vast amount of press that it has generated? Does the approach guide management actions that are being implemented by the Regional Councils? My sense is that the ethic espoused in this approach, which advocates risk-averse targets as 'biological reference points' relative to those recommended historically, is accepted in principle and is being applied in amendments to many FMPs. There has been a notable shift towards setting fishing mortality rates and target spawning stock biomasses at levels that provide opportunity for overfished stocks to recover. U.S. scientists have taken a lead in developing criteria for setting risk-averse biological reference points to restore stocks that are overfished and to protect stocks at higher abundance levels (e.g. Restrepo and Powers 1999). I know of no dramatic recoveries in stocks since 1996 (there has not been enough time), but it is probable that reference points, targets, and limits on fishing mortality and spawning stock biomasses that have been set since implementation of the amended SFA will reverse stock declines in many fisheries.

Inclusion of specific language in the present Magnuson-Stevens SFA reauthorization process that addresses selection of target biological reference points relative to the broader range of reference points that could be selected will be useful to the Councils. Many FMPs already are being revised with precautionary fishing mortality and spawning-stock biomass targets specified. In this context, it is interesting to note that the NAS report 'Sustaining Marine Fisheries' specifically advised that the first step in moving towards ecosystem-based approaches to fisheries management was to respect the uncertainties in behavior of marine ecosystems and set conservative fishing targets in single-species fisheries (NAS 1999a), thus relieving stress to the individual exploited stocks that often are key constituents of ecosystems.

The SFA (1996) contains specific language on Essential Fish Habitat (EFH), directing Councils to identify such habitats in their respective FMPs and presumably to implement measures to protect such habitats to insure healthy fisheries. The definition of EFH as it now stands is so broad that it is questionably useful in the management process. Some additional thinking is necessary, to be followed by more specific language on EFH in a reauthorized SFA. I am not certain that a specific National Standard needs to be added to the SFA in the present reauthorization, but this possibility should be considered. The EFH concept has stimulated a flurry of scientific activity directed towards understanding habitat issues in the past few years that should be useful in developing criteria and standards for FMPs.

On a global basis, social scientists and economists have recognized the need to control burgeoning effort and excess fishing capacity by restricting the open-access privilege to fish. Limiting entry and establishing individual fishing quotas (IFQs) have been debated vigorously (e.g. Hanna et al. 2000). A NAS study, requested in the SFA (1996) reauthorization was guardedly positive on the role of IFQs and recommended that they be allowed in specific fisheries at the discretion of the Regional Councils. The accumulated evidence from a scientific perspective supports the implementation of IFQ management under appropriate circumstances, recognizing the need to consider initial allocation of shares, the threat of monopolies developing, and the rules for transfer and duration of IFQ permits. Benefits of IFQs in addition to controls

on effort (and fishing mortality) are probable. IFQ-based management is potentially more ecosystem friendly than unrestricted participation in some fisheries. This may be true, for example, with respect to fishing impacts on habitat and with respect to bycatch reduction. I believe that Congress should allow IFQs as a management approach in a reauthorized SFA. I am sensitive to the arguments against this approach, but the evidence is strong that IFQs can benefit some fisheries. The Councils should have the possibility to implement them in appropriate situations.

The NAS undertook a study on the 'Community Development Quota Program in Alaska' in response to a request of the 1996 Magnuson-Stevens reauthorization (NAS 1999b), concluding that this community-based experiment in managing and allocating fisheries resources is succeeding, bringing both social and economic benefits. In a broader context, consideration of other community-based management and shared management approaches that actively involve stakeholders seems justified and a means to promote equitability in fisheries. I am no expert on this approach, but the reauthorization process needs to address co-management and its potential, especially its relationship to and role that it can play with respect to traditional, more centralized authority vested in management by the federal government and the Regional Councils.

There is a growing worry that fisheries management is too little concerned with marine ecosystems, their stability, variability, and the sustainability of high productivity that will assure sustainable and profitable fisheries. The amended SFA (1996) recognized this concern. Accordingly, Congress mandated that an Ecosystems Principles Advisory Panel be established to undertake an analysis of the extent to which ecosystem principles were being applied in fisheries and to recommend actions that should be undertaken by the Secretary of Commerce and Congress to expand application of ecosystem principles in fisheries management. The report of the Panel (NMFS, 1999) includes many specific recommendations and a major conceptual recommendation -- the proposal that each Council develop a Fishery Ecosystem Plan(s) within their regions. A FEP is envisioned to be a document that serves as an umbrella under which individual FMPs would reside and to which they must adhere. If adopted, many individual FMPs would be more ecosystem-sensitive. The function and structure of ecosystems would be at the center of concern with respect to management of the ecosystem's constituent fisheries. The recommendations of the Panel, listed below, should be debated and seriously considered for inclusion in a reauthorized SFA:

Develop a Fisheries Ecosystem Plan

- Delineate the geographic extent of the ecosystem(s) that occur(s) within Council authority, including characterization of the biological, chemical, and physical dynamics of those ecosystems, and "zone" the area for alternative uses.
- Develop a conceptual model of the food web.
- Describe the habitat needs of different life history stages for all plants and animals that represent the "significant food web" and how they are considered in conservation and management measures.
- Calculate total removals--including incidental mortality--and show how they relate to standing biomass, production, optimum yields, natural mortality, and trophic structure.
- Assess how uncertainty is characterized and what kind of buffers against uncertainty are included in conservation and management actions.
- Develop indices of ecosystem health as targets for management.
- Describe available long-term monitoring data and how they are used.
- Assess the ecological, human, and institutional elements of the ecosystem which most significantly affect fisheries, and are outside Council/Department of Commerce (DOC) authority. Included should be a strategy to address those influences in order to achieve both FMP and FEP objectives.

Measures To Implement FEPs

- Encourage the Councils to apply ecosystem principles, goals, and policies to ongoing activities.
- Provide training to Council members and staff.
- Prepare guidelines for FEPs.
- Develop demonstration FEPs.
- Provide oversight to ensure development of and compliance with FEPs.
- Enact legislation requiring FEPs.

Research Required To Support Management

- Determine the ecosystem effects of fishing.
- Monitor trends and dynamics in marine ecosystems (ECOWATCH).
- Explore ecosystem-based approaches to governance.

The Ecosystems Panel recognized the potential benefits of Marine Protected Areas, some of which could be Marine Reserves that would prohibit fishing. Closed area management is not new in fisheries but has been used rather sparingly. The concept of closed areas, with various restrictions on fishing, was recognized in the 1996 reauthorization (SFA, 1996) and has been on the planning tables of Regional Councils in recent years. Some areas have, in fact, been closed to many kinds of fishing effort (e.g. parts of Georges Bank). A detailed study of MPAs by the NAS (2001) broadly evaluated their potential, including their use as a tool in fisheries management. The NAS Committee concluded that MPAs did have a role in fisheries management. In the broadest sense, setting aside areas to protect spawning stock can serve as buffers against the uncertainties of accurate stock assessments, a kind of insurance. More specifically, the Committee recommended that MPAs for fisheries conservation should be designed as parts of broader networks of MPAs that are zoned for permitted activities, with the networks included in a broader plan of coastal ocean management that considers the full spectrum of human activities and need to protect ecosystem structure and function. The NAS Committee recognized and emphasized that stakeholders (fishers) must be included in every stage of MPA development, from discussion of concept through design, and continuing into the evaluation and monitoring phase after implementation. The Committee did not specify any particular size or numbers of MPAs that would be required to benefit fisheries management, believing that each region or case would have to be considered individually. If MPAs become a significant tool in fisheries management, they will represent a shift in emphasis from traditional management measures that seek to control catch levels and fishing effort (amounts or types) towards an emphasis on managing the spatial components of ecosystems for specific benefits to fisheries and fish stocks. Management that includes MPAs as a tool may have particular benefits in meeting EFH goals, in reducing damage to unique habitats from fishing, in reducing bycatch of young fish, in protecting endangered or threatened species, and in conserving biodiversity of marine ecosystems.

MPAs cannot be viewed as a stand-alone solution to fishery management problems. In some instances it is probable that fisheries benefits and values will outweigh the environmental costs attributable to fishing and MPAs may not be recommended from either an economic or environmental viewpoint. Language in the pending reauthorization of the SFA should address the issues of costs and benefits of not only EFH considerations, but also of the broader issue of establishment of MPAs. The urgency to do this is underscored by the Executive Order issued by President Clinton in May 2000 directing federal agencies to develop networks of MPAs in the coastal ocean.

The issues of data availability, collection of data, and data management for stock assessment and management purposes represent key needs for improvement that should be addressed in the reauthorized SFA. The NAS Committee, in its report (NAS, 2000a) developed a comprehensive list of detailed recommendations specifically addressed to Congress, NMFS, or the Councils. Many of the same concerns also were expressed in the Heinz Center report (Hanna et al., 2000). I hope that the NAS recommendations will be considered during the SFA reauthorization process. It seems certain that implementing the recommendations will require new funding. I have consolidated and summarized some of the NAS recommendations:

- *Congress and NMFS*. Standardize and improve fisheries data collection and management methods and procedures nationwide. Develop a Fisheries Information System. Fund these efforts.
- *Councils*. Councils should be more proactive in determining needs and requesting appropriate data and models to improve potential for success in management. This recommendation is applicable to both commercial and recreational fisheries.
- *Congress*. Make commercial fisheries data more accessible to agencies for stock assessment scientists by amending laws relevant to confidentiality.
- *NMFS*. Develop more cost-effective ways to collect and manage data, including data collected for recreational fisheries in the MRFSS surveys.
- *NMFS*. Develop new data collection and stock-assessment methods, including those that consider ecosystem functions and processes, habitats, and environmental variability.
- *NMFS*. Involve stakeholders (fishers) in the data identification and collection processes more than at present. Better cooperation with stakeholders will improve quality of data. Reports of data analysis and assessments should be made available to stakeholders on a regular basis.
- *Congress and NMFS*. Insure that NOAA has a strong and capable fleet of research and survey vessels for fisheries data collection and assessment.
- *Congress and NMFS*. Increase the level of observer coverage on fishing vessels to improve data collection and interpretation.
- *Congress, NMFS and Councils*. Institute better and more complete monitoring and evaluation of marine ecosystems and EFH. Build this information into stock assessments.
- *NMFS and Councils*. Scientific review of stock assessments by independent scientists is important. Add stock assessment experts to Council staffs.

Many of the recommendations in the bulleted statements above will require significant increased funding and also additional staff and personnel trained in quantitative fisheries science, economics, and sociology. At present, NMFS cannot meet its demand for stock assessment specialists and has too few social scientists and economists on its staff to effectively provide management information and advice to the Councils. A NAS workshop (NAS 2000b) on manpower needs in NMFS explored the need for such experts and made recommendations to NMFS that may help recruit new talent. However, it is not certain that such needs can be met in the short term without significant stimulation of effort and funding by Congress. Furthermore, the needs for stock assessment experts and socioeconomic experts on Council staffs and in academia (to train the new wave of experts) is problematic, a kind of Catch-22 since virtually all experts in quantitative fisheries science at the Ph.D. level who are U.S. citizens now take positions in NMFS, leaving a minuscule pool of talent for Council staffs or for academic institutions to recruit into faculty ranks.

The shortage of scientists with strong quantitative skills in fisheries also results in a reduced pool of independent reviewers of stock assessments and other technical elements of FMPs. Each Council is required to maintain a Scientific and Statistical Committee. Included on SSCs is a small cadre of quantitative

scientists that is burdened repeatedly to review stock assessments by some Councils. However, the eight Councils do not use the SSCs in any uniform fashion. There is a need to increase the pool of experts, but also to move towards standardizing the process by which SSCs review technical components of FMPs and provide advice to the Councils.

There are many science-related issues that should be addressed in the reauthorization process. The problems of fisheries science and management, and recommendations to solve them, were superbly documented by Pamela Mace in her keynote address at the 2nd World Fisheries Congress (Mace, 1997). Mace's essay is global in scope, but most of the issues she addresses are relevant to U.S. fisheries. Mace (1997) believes that overcapacity is the single largest problem in fisheries management on a global basis, and that control of excess effort is essential to have healthy fisheries. Also, she states, "I contend that, to date, lack of national policies and institutional failures have been more limiting than science, management or data. Sound national and international policy and effective institutions are essential for providing the necessary environment to foster good science, management and data collection programmes." I agree with that statement. Mace (1997) lists the "inadequacies" of science and management that need to be addressed in developing overall fisheries management programs. The order of presentation represents the relative magnitude of the problem in her view:

- Inadequate national policies and international standards.
- Inadequate institutions and other mechanisms for involving stakeholders.
- Inadequate data and statistics.
- Inadequate or inappropriate management goals.
- Inadequate science.

As the SFA reauthorization process moves forward, it is appropriate that these inadequacies be kept in mind and addressed. The reauthorization process offers an opportunity to improve the SFA and marine fisheries performance. I am reasonably optimistic that an amended SFA can be a major element in the long-term prospects for revitalization of U.S. fisheries.

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